A Study of Applying a 3D Instructional Software of Popular Science (Science On a Sphere Explorer) in Earth Science Education of an Elementary School

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Abstract— **The increasing popularization of information technology has gradually overcome the difficulties of educating earth science gradually. In the times of having only textbooks, we merely had 2D maps for references to educate earth science. However, it was known that the earth was round, but it was hard for students to understand flows of ocean currents, atmospheric flows, ship movements, or directions of typhoons from those 2D maps. Nevertheless, the development of information technology and computers had solved these problems. For instance, we could use software to simulate flight of airplanes, navigation direction of ships, and moving route of cars. Based on the evolvements of these computer technologies, our lab considered using 3D visual effects to display the earth and educate earth science; consequently, we designed the software "Science On a Sphere Explorer." In it, we have integrated several hundreds of environmental science data from National Oceanic and Atmospheric Administration and utilized 3D visual effects to educate earth science. In this study, the authors introduce the software and describe the instructional outcomes.**

Keyword— **Science On a Sphere Explorer; SOSx; 3D; Visualization; NOAA**

WenWei Liao is a research scientist in the University of Colorado Boulder Cooperative Institute for Research in Environmental Sciences (CIRES) His research interests span both education and computer technologies. Much of his work has been on improving the education technologies and the performance of the computer technologies. Dr. Liao is the corresponding author of the paper "A Study of Applying a 3D Instructional Software of Popular Science (Science On a Sphere Explorer) in Earth Science Education of an Elementary School". He is also a good principal investigator in the University of Colorado Boulder.

Eric Hackathorn is a senior developer for Data Visualization, Simulation, and Games at the National Oceanic and Atmospheric Administration (NOAA). The project leverages game mechanics and technology for a variety of projects and has unique expertise straddling science, education, and entertainment. In the past couple of years he has taken this background and created SOS Explorer, an additional "flat screen" product for Science On a Sphere that is used in exhibit settings along with a free mobile version that is available in the app stores. Eric has also served on advisory boards for NASA and NSF grants and worked on projects with several government agencies including NOAA, NASA, DOE, and the DOD. He is also a recipient of Federal Computer Week's "Fed 100."

Suefen is the deputy director of the Social and Data Science research center in Hwa-Kang Xing-Ye Foundation. Hwa-Kang is the biggest training center in Taiwan. Hwa-Kang has several thousand classes for all kinds of the people. Suefen is also a science teacher of the elementary school students, she has several years experiences of the science teaching.